DOCUMENT RESUME

ED 104 132 PL 006 395

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TITLE Note on the Acquisition of Affricates and Fricatives. Papers and Reports on Child Language Development, No. 6.
INSTITUTION Stanford Univ., Calif. Committee on Linguistics.
PUB DATE Apr 73
NOTE 10p.

EDRS PRICE MF-$0.76 HC-$1.58 PLUS POSTAGE
DESCRIPTORS Articulation (Speech); *Child Language; English; *Language Development; Linguistic Theory; *Phonological Units; Phonology; *Psycholinguistics; *Speech
IDENTIFIERS Affricates; Fricatives

ABSTRACT

This paper attempts to demonstrate that children do not necessarily acquire fricatives before affricates. It begins with a summary and explanation of relevant parts of R. Jakobson's general theory of phonological acquisition. In part 2, an account of one child's acquisition of English affricates and fricatives is presented. In the period studied, the child had already mastered simple stops and had just acquired /ts/ and /dz/. She had the fricatives /s/, /z/, and followed various procedures in handling the rest of the English fricatives, which were difficult for her. The case was clearly a counterexample to the theory of fricatives before affricates. (Author/PMP)

ED104132

# NOTE ON THE ACQUISITION OF AFFRICATES AND FRICATIVES*

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FL 006395

Papers and Reports on Child Language Development, No. 6
April 1973

## INTRODUCTION

Universal claims that phonemes, natural classes of phonemes, or phonemic distinctions are acquired in some specific order are recurrent in the child language literature. A common assertion is that children should acquire fricatives before affricates.[1] This claim is generally held to be one of a well-known series of predictions made by the great Roman Jakobson as part of his general theory of phonological acquisition.[2]

In this note, I will attempt to demonstrate that fricatives are not necessarily acquired before affricates. First, it is not that case that Jakobson's implicational rules actually say that a child must acquire fricatives before affricates. This was pointed out to me by Paul Kiparsky (pers. comm. ). Since it is clear that students of child language are going to be discussing the content and nature of Jakobson's claims for some time yet, I will present the relevant passages from Child language, aphasia, and phonological universals, along with Kiparsky's explication. Second, I will follow the above discussion with an account of one child's acquisition of English affricates and fricatives. In the period studied, the child, who has already mastered simple stops, has just acquired /tš/ and /dž/. She has the fricatives /s/, /z/, and follows various procedures in handling the rest of the English fricatives, which are difficult for her. This case is clearly a counterexample to the claim of fricatives before affricates. But it is in no way a counterexample to the interpretation of Jakobson's work given by Kiparsky; as a matter of fact it would be very unlikely for any child learning English to provide a counterexample to Jakobson. Lastly, it is also hoped that this data will exemplify the kind of flexibility that children have in their choice of language learning strategy.

## JAKOBSON'S THEORY

Jakobson's claim (1968) refers to the development of phonemically contrasting manners of articulation.

> A so-called half-stop consonant (or affricate) which functions as an opposition to the corresponding stop consonant in phonemic systems is acquired by the child only after the fricative of the same series. (p. 55)

While disposing of an example rather like the one I will present and centering on another topic, he also says:

> But children who have not yet acquired any fricative sound frequently split the palato-velar series into a velar and a palatal, by developing in addition to /k/ a (sometimes more or less affricated) palatal stop from the French /ʃ/ (or ʃ and s) and in this way temporarily present a quadrangular consonantal system. (p. 14)

This indicates that a system in which the claim of the first quote could be falsified would be one which had a full set of parallel series of stop, fricative, and affricate phonemes. For example, a totally symmetric hypothetical language might have the system

| | | | | | | |
|---|---|---|---|---|---|---|
| p | p͡f | f | b | b͡v | v | labial series |
| t | t͡s | s | d | d͡z | z | dental series |
| k' | č | š | g' | ǰ | ž | palatal series |
| k | k͡x | x | g | g͡ɣ | ɣ | velar series |

with stop, affricate, and fricative phonemes in each of four articulatory positions.

In English, however, we have not got a straightforward phonemic contrast among plain stop, affricate, and fricative manners. On the contrary, we have only two affricates, and they fill a missing 'slot' in the stop set: We have palatal fricatives, but no palatal plain stops; our affricates, which are palatal, have no plain stops in direct positional contrast with them. In other words, 'affricate' (or 'delayed release') is a redundant, non-distinctive feature in English, and the split plain stop/affricate is not truly a phonemic contrast. Schematically;

| | | | | | |
|---|---|---|---|---|---|
| English | p | f | b | v | labial |
| | t | s | d | z | dental |
| | č | š | ǰ | ž | palatal |
| | k | | g | | |

Kiparsky pointed out that viewing č, ǰ as modified palatals is historically correct, and that a process of affricating palatal stops is among the most frequent developments in language histories, occurring over and over in the parallel evolution of unrelated languages. We can see that a child learning English is not a likely candidate to have a phonemic plain stop/affricate contrast, although a child learning German might be.

DATA

The child studied, code-named Dory, is one of several normal children on whom extensive longitudinal taped, filmed, and written materials were gathered by the remarkable efforts of Dr. Margaret Bullowa of M.I.T. and her colleagues.[3]

The material for analysis consists of a number of weekly taped and filmed half-hour sessions which were conducted at the child's home over a period of several years. The stage in this note is found on at least two tapes, labeled W118 and W120, recorded at 1;2,13 and 1;2,20 respectively.

The words considered are referential, and not nonsense, to the child. Table 1 contains all transcribable forms on these two tapes which have fricative or affricates in their English models. No extraneous fricatives or affricates were produced by Dory in words whose English models have neither affricates nor fricatives. In the table, M (modeled) means that the mother has supplied the English word just before Dory says it; S (spontaneous) indicates that Dory is not repeating a word that could be lingering in short-term auditory memory. The models for words #4, #9, and #22 were, as noted, corrections supplied by Dory's mother in response to Dory's spontaneous utterances #3, #8, and #21 respectively. A broad transcription of the mother's speech is given when her Boston speech differs strongly from General American (see Table 1).

Table 1. Words used by Dory that contained either an affricate or a fricative in the adult version.

| Tape | English | | Dory | Notes |
|---|---|---|---|---|
| W118 | Affricates, Affricating Clusters | | | |
| | 1. choochoo | S | /tšutšu/ | "labored" /tš/ |
| | 2. George | M [džo:dž] | /džodž/ | |
| | 3. Betsy | S | /detsi/ | |
| | 4. Betsy | M (correcting #3) | /betsi/ | |
| | Fricatives | | | |
| | 5. Esther | M [estʌ] | /et:ʌ/ | /s/ replaced by adjacent and homorganic /t/ |
| | 6. Katherine | M | /kakɨn/ | /θ/ replaced by nearby /k/ |
| W120 | Affricates | | | |
| | 7. Jingles (name) | M | /Xʌŋʌ/ | X denotes untranscribable mess |
| | 8. Cheerio (cereal) | S | /tšitš/ | |
| | 9. Cheerio (cereal) | M (correcting #8) | /tšio/ | |
| | 10. touch | M | /tʌtš/ | |
| | 11. touch | S | /tʌtš/ | |
| | 12. Jean | | /džin/ | |
| | 13. Charlie | M (tšæ:lij) | /džæwi/ | voicing error |
| | 14. Joey | M | /džoi/ | |
| | Fricatives | | | |
| | 15. horsey | M (has:i) | /hadɪ/ | /s/ replaced by homorganic stop |
| | 16. that | S | /dæt/ | /ð/ replaced by hm. st. |
| | 17. Esther | M (estʌ) | /et:ʌ/ | /s/ replaced by hm. st. (and adjacent) stop |
| | 18. nose | M | /no/ | /z/ lost |
| | 19. Katherine | M | /kaɵi/ | |
| | 20. breakfast | M | /bekɨs/ | /f/ lost, but /s/ preserved |
| | 21. fishie | S | /itši/ | /f/ lost, /š/ replaced by /tš/ |
| | 22. fish | M | /wɔtš/ | /f/ replaced by /w/, /š/ replaced by /tš/ |

Recall that no English plain stop is homorganic to /š/, but that /tš/ ([-continuant, +delayed release]) is. It is clear from the table that if an English non-vocalic phoneme presents a difficulty and must be approximated, the position of the English model phoneme and the feature [-continuant] will be preserved, while the manner of articulation and the feature [+continuant] may be sacrificed. It is also clear that an all-or-nothing notion of 'acquisition' of phonemes or phoneme classes is too crude to deal with the facts of child language, but a detailed treatment of the nature of the acquisition of phonemes does not exist, to my knowledge. I will try to touch on the major points which are necessary to evaluate the above data.

We must first notice that #3 Betsy S /detsi/ and #8 Cheerio S /tšitš/ are notably improved to #4 Betsy M /betsi/ and #9 Cheerio M /tšio/, respectively, by the mother's correction.[4] This implies that the presence or absence of a model word must not be disregarded. Mastery of a sound proceeds by slow stages, and the ability to copy a sound in a word correctly may precede mastery of it in spontaneous utterance by many months. Thus, while the difference between #6, Katherine M /kakɨn/ and #19 Katherine M /kaɛθi/ recorded a week later is real, we should not weight the modeled /θ/ as we should weight the spontaneous occurrences of /tš/ in #1 choochoo S /tšutšu/, #8 Cheerio S /tšitš/, and #11 touch S /tʌtš/, or the spontaneous /ts/ in #3 Betsy S /detsi/ in judging the mastery of /tš, ts/. But by the same reasoning, errors that persist in spite of corrections are maximally significant in judging what the child has not mastered. The word that nails down the comparison between the well-controlled affricates and the marginally-acquired fricatives is the corrected #22 fish M /wɔtš/, a sad specimen compared to #11 touch or #12 Jean. In #22, Dory's /w/ preserves the labiality of the /f/, and the /tš/ is a strident palatal like /š/ -- her attempt is no stab in the dark - but 'fricative', equivalent to the conjunction 'continuant and consonantal and non-vocalic', is not preserved.

It is clear that postdental /s/, /z/ are well in hand at this stage. Possibly all four of /ts/, /dz/, /tš/, /dž/ should be regarded as units for this child at this time. It is certainly reasonable to consider /tš/ a unit, since /š/ is found only in /tš/, and we have absolutely no justification for setting up an elaborate conditioned variation argument -- of what could /š/ be variant? If these four affricates are regarded as units, however, we must note a lack of symmetry, as /z/ and /s/ are found in spontaneous utterances in postvocalic final position in samples before and after W118 and W120, and so presumably exist as independent phonemes during this stage as well. But complete distributional symmetries are not to be expected in child language any more than in the speech of adults.

Two months later, at 1;4,8 various things, still mostly homorganic substitutions of one sort or another, happen to English fricatives that Dory attempts. Two improvements are evidenced: "after" is rendered as /æf:ʌ/, and she has reached an intermediate stage between /tš/ and /š/ for "sh", produced in the word "dishes". The "sh" in this word is noted as 'very thick, Germanic', and on another hearing as 'a little caressive'.

A great deal more time elapses during which the fricatives are only partially mastered and the affricates remain firm. Half a year later, Bullowa, Jones, and Duckert report that "shoe" is almost always /šu/, though occasionally still /tšu/. /š/ is also reported in "she". But "At this time, Dory had not yet attained three other English fricatives, /f/, /s/, /z/ ... at least not in initial position". They report "find" with initial /p/, and a modeled "Susan" with /θ/, /ð/, respectively for /s/, /z/. Therefore, we must still say that 2 months after Dory has acquired English affricates, she has only 'conditionally acquired' the fricatives /f/, /s/, /z/. We cannot use the unmodified word 'acquired' of a phoneme until there are no contextual constraints on its appearance other than those in the adult language being learned.[5] I do not know if the great lapse of time from when Dory gets /s/, /z/ in final position until the time she gets them in initial and intervocalic position is unusual or not.

Something which does seem unusual is the substituting of /θ/, /ð/, for /s/, /z/ in 'Susan'.[6] I have no information on this later period of Dory's speech except what Bullowa, Jones and Duckert contains, but if Dory has a general substitution of non-strident for strident dentals except in final position, and has the final /s/, /z/ correct, then she isn't lisping, but developing the fricatives in an unusual order.

As I emphasized above, there is no straightforward counterexample to be expected to the Jakobsonian affricates-before-fricatives in this material, because delayed release is redundant in English. Of course, the possibility remains that an English-learning child could temporarily set up parallel sets simple stop--affricate--fricative for himself. Then the Jakobson claim would be falsifiable.

Above, I have mentioned that Dory might actually be viewed as having three sets in the dental series with the two palatal sets parallel to them

| | | | | | |
|---|---|---|---|---|---|
| t | ts | s | d | dz | z |
| | tš | š | | dž | ž |

but the data, in the absence of velar or labial affricates, are too skimpy to serve as anything but a reminder not to preclude the possibility that a child learning English might set up a system in which [+delayed release] was not redundant.

An earthier approach to Dory's apparent /ts/, /dz/ unit phonemes would be to declare so fine an analysis of a handful of words to be an exercise in the making of silk purses from sows' ears. Probably we should simply observe that saying /s/ and /z/ after /t/, /d/ should be relatively easy because one's tongue is already in the right place.

Dory's overall preferred process of substituting homorganic stops for fricatives, incidentally, implies that if she can maintain it, a palatal stop /t'/ should be the output of choice for /š/; this sound was in fact

observed by Bullowa, Jones, and Duckert as Dory's earliest try as /š/. Later on they report just a /t/, which should be noted because it prevents us from saying that Dory simply followed a 'natural' progression from palatal stop to palatal affricate. The shift from /t'/ to /t/ is in fact of importance, because it means that the child's system has responded to the absence of /t'/ in English, a fact as mysterious as any other in the acquisition phenomena.

I will not spare a philosophical conclusion, although it is broader than the above data can support alone: There are many ways in which a child may organize the barrage of incoming sounds in order to get a handle on them. The search should be for strategic universals in language acquisition, and not for substantive universals. The number of substantive universals that are falsifiable and true is surely small and their predictions seem far short of being able to organize the richly structured and varied material of child language.

## FOOTNOTES

* This work was done while the author resided within commuting distance of M.I.T. Materials were made available by Dr. Margaret Bullowa of the Research Laboratory of Electronics. I would like to express here my gratitude to her for her time and interest, and also to Paul Kiparsky for his major critical contribution. Errors are my own.

1. In English, the fricatives are [+ continuant] /f s θ š v z d ž/, and the affricates [- continuant, + delayed release] /tš/ and /dž/. The affricates are unit phonemes, but the digraphs are useful notation in this instance. They are traditionally written with dental rather than palatal onset, since the latter can be inferred.

2. Child language aphasia, and phonological universals, Janua Linguarum 72. Mouton, The Hague, originally published as Kindersprache, Aphasie und allgemeine Lautgesetze, 1941.

3. Other material on this child has been published; she and her mother are very talkative, and so great favorites with investigators. The most relevant of those papers is Bullowa, Jones, and Duckert, 1964, which provides some independent checks on my observations. Also of interest is Bullowa, Jones, and Bever, 1964.

4. Placing #3, #4 with affricates is deliberately meant to suggest that for Dory, /ts/ (as well as /dz/ in other sessions) is functionally parallel to /tš/ and /dž/.

5. For a discussion of phonological constraints on the production of a phoneme, see Ingram, (ms.). 'Conditionally acquired' is my own coinage, and its definition may want some revision in a case where a child uses a phoneme correctly in all but a few difficult cases.

6. This was called to my attention by Charles A. Ferguson (personal communication).

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